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Project Number: 12CA27273C
File Number: MC15343
Date: May 29, 2012
Model: PPV3

Electromagnetic Compatibility Test Report

For

Chamberlain Group Inc.

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Test Report Details

Tests Performed By: **UL LLC**
 333 Pfingsten Rd.
 Northbrook, IL 60062

Tests Performed For: **Chamberlain Group Inc.**
 845 Larch Av
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Applicant Contact: **Hank Sieradzki**
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Test Report Date: **May 29, 2012**

Product Type: **Periodic Transmitter**

Product standards **FCC Part 15, Subpart C, 15.231 & RSS-210**

Model Number: **PP3V**

EUT Category: **Wireless Device**

Testing Start Date: **May 10, 2012**

Date Testing Complete: **May 23, 2012**

Overall Results: **Compliant**

UL LLC reports apply only to the specific samples tested under stated test conditions. All samples tested were in good operating condition throughout the entire test program. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. UL LLC shall have no liability for any deductions, inferences or generalizations drawn by the client or others from UL LLC issued reports. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

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Report Revision History

Revision Date	Description	Revised By	Revision Reviewed By
none			

1.0 GENERAL - Product Description

1.1 Equipment Description

The equipment under test is a multiple channel portable periodic transmitter operating at 310MHz, 315MHz and 390MHz.

1.2 Device Configuration During Test

1.2.1 Equipment Used During Test:

Use	Product Type	Manufacturer	Model	Comments
EUT	Periodic Transmitter	Chamberlain Group Inc.	PP3V	During testing this device was referenced to by sample number starting with SMP32477
Note: EUT - Equipment Under Test, AE - Auxiliary/Associated Equipment, or SIM - Simulator (Not Subjected to Test)				

1.2.2 Input/Output Ports:

Port #	Name	Type*	Cable Max. >3m (Y/N)	Cable Shielded (Y/N)	Comments
0	Enclosure	N/E	—	—	None
Note: AC = AC Power Port DC = DC Power Port N/E = Non-Electrical I/O = Signal Input or Output Port (Not Involved in Process Control) TP = Telecommunication Ports					

1.2.3 Power Interface:

Mode # /Rated	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
1	3	-	-	dc	-	Battery Operated

1.3 EUT Configurations

Mode #	Description
1	EUT with fresh batteries set to transmit.

1.4 EUT Operation Modes

Mode #	Description
1	EUT transmitting on 310MHz, 315MHz, and 390MHz.

1.5 Rational for EUT Configuration

Mode #	Description
1	The Fundamental frequencies were measured in various axis (X, Y, and Z) and worst case axis was established – Z Axis. All harmonics were measured based on the worst case axis found.

2.0 **Summary**

The tests listed in the Summary of Testing section of this report have been performed and the results recorded by UL LLC in accordance with the procedures stated in each test requirement and specification. The applicant determined the list of tests performed were applicable to the Equipment Under Test. As a result, the subject product has been verified to comply or not comply as noted in the Summary of Testing with each test specification. The test results relate only to the items tested.

2.1 **Deviations from standard test methods**

None

2.2 **Device Modifications Necessary for Compliance**

None

2.3 Reference Standards

Standard Number	Standard Name	Standard Date
FCC Part 15, Subpart C, 15.231	Code of Federal Regulations, Part 15, Radio Frequency Devices	2010
RSS-210	License - exempt Radio Apparatus (All Frequency Bands): Category I Equipment	Issue 8

2.4 Results Summary

Requirement – Test	Result (Compliant / Non-Compliant)*
Line Conducted Emissions	N/A – EUT is battery operated only
Occupied Bandwidth	Compliant
Cease Operation	Compliant
Pulse Train and Duty Cycle	Compliant
Fundamental Frequency & Spurious Radiated Emissions	Compliant

Test Engineer:



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Conformity Assessment Services

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3.0 Calibration of Equipment Used for Measurement

All test equipment and test accessories are calibrated on a regular basis. The maximum time between calibrations is one year or the manufacturers' recommendation, whichever is less.

All test equipment calibrations are traceable to the National Institute of Standards and Technology (NIST); therefore, all test data recorded in this report is traceable to NIST.

4.0 EMISSIONS TEST RESULTS

The emissions tests were performed according to following regulations:

FCC	47 CFR Part 15 – Intentional Radiators
IC	RSS-210 and RSS-Gen License - exempt Radio Apparatus

Unless specified otherwise in the individual Methods, the tests shall be conducted under the following ambient conditions. Confirmation of these conditions shall be verified at the time the test is conducted.

Ambient Temperature, °C	22.5 ± 2.5	Relative Humidity, %	45 ± 15	Barometric Pressure, mBar	950 ± 150
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Sample Calculations

Radiated Field Strength and Conducted Emissions data contained within this report is calculated on the following basis:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Meter Reading (dBuV)} + \text{AF (dB/m)} - \text{Gain (dB)} + \text{Cable Loss (dB)} \\ \text{Conducted Voltage (dBuV)} &= \text{Meter Reading (dBuV)} + \text{Cable Loss (dB)} + \text{LISN IL (dB)} \\ \text{Conducted Current (dBuA)} &= \text{Meter Reading (dBuV)} + \text{Cable Loss (dB)} - \text{Transducer Factor (dBohms)} \end{aligned}$$

4.1 Test Conditions and Results – Occupied Bandwidth

Test Description	Measurements were made in the laboratory environment. A Dipole (or equivalent) antenna tuned to the transmit frequency was attached to the input of a spectrum analyzer. The device was operated and the spectrum analyzer resolution bandwidth set per the appropriate standard.
Basic Standard	47 CFR Part 15.231(c)
Occupied Bandwidth Limits	
0.25% of Center Frequency (310MHz: 775.0kHz, 315MHz: 787.5kHz, 390MHz: 975.0kHz)	

Table 1 Occupied Bandwidth Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

Table 2 Occupied Bandwidth Spectrum Analyzer Settings

Resolution Bandwidth	Occupied Bandwidth Requirements	
	dBc	% PWR
10kHz	-20	99
Supplementary information: None		

Table 3 Occupied Bandwidth Test Result Summary

Center Frequency	20dB BW Measured (kHz)	99% BW Measured (kHz)
310MHz	48.8	102.4
315MHz	49.2	102.0
390MHz	48.8	101.6

Table 4 Occupied Bandwidth Test Equipment

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323	Dec 28 2011	Dec 31 2012
Generic Near Field Loop Antenna	-	-	-	-	-

Figure 1 – 20dB Bandwidth Graph for 310MHz

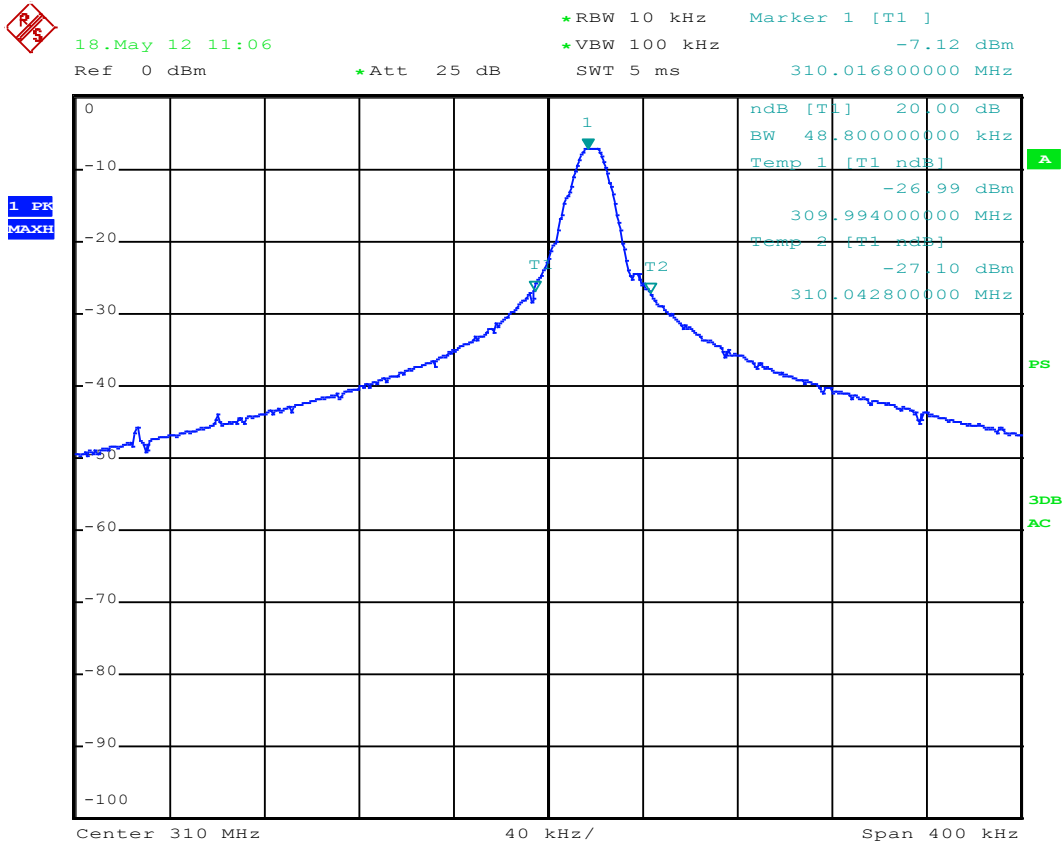


Figure 2 – 20dB Bandwidth Graph for 315MHz

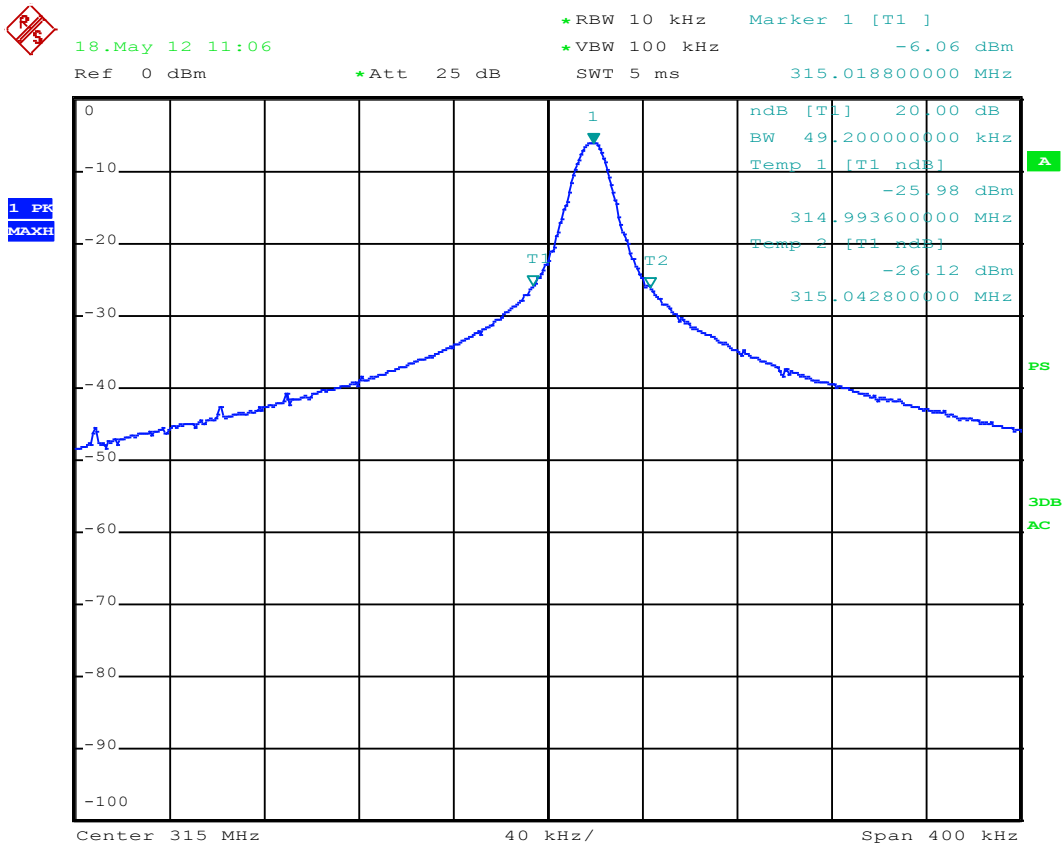


Figure 3 – 20dB Bandwidth Graph for 390MHz

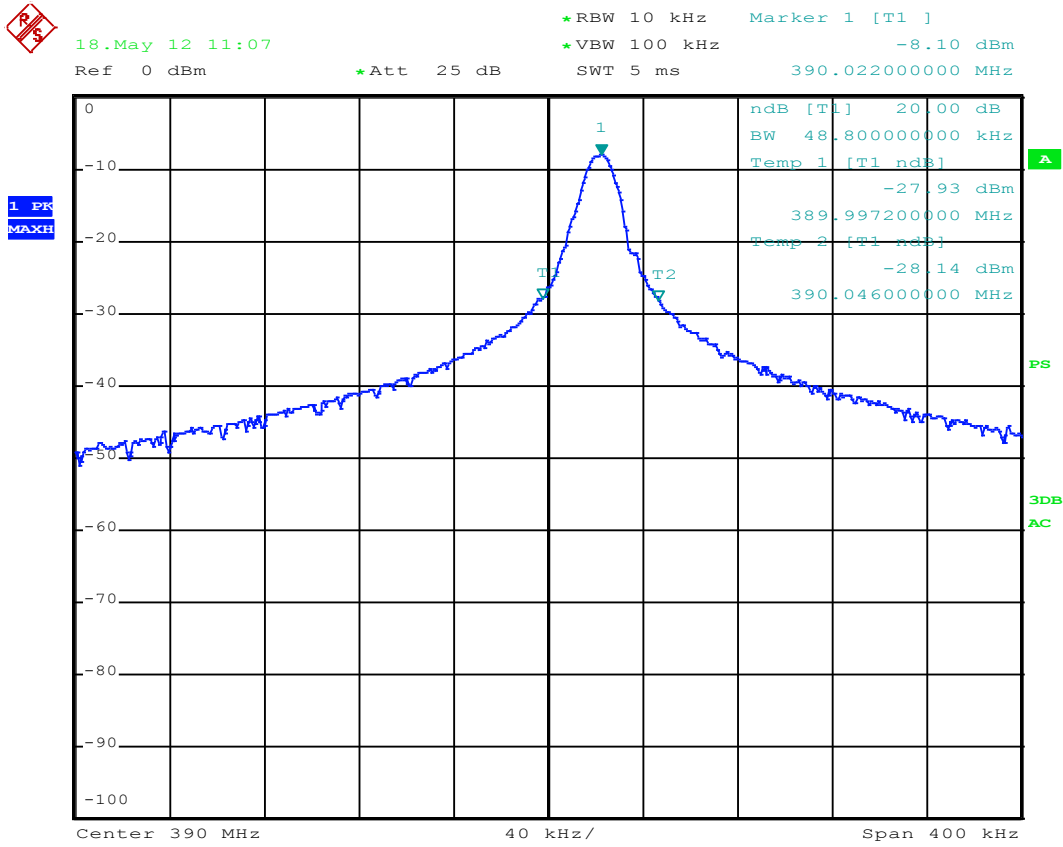


Figure 4 – 99% Bandwidth Graph for 310MHz

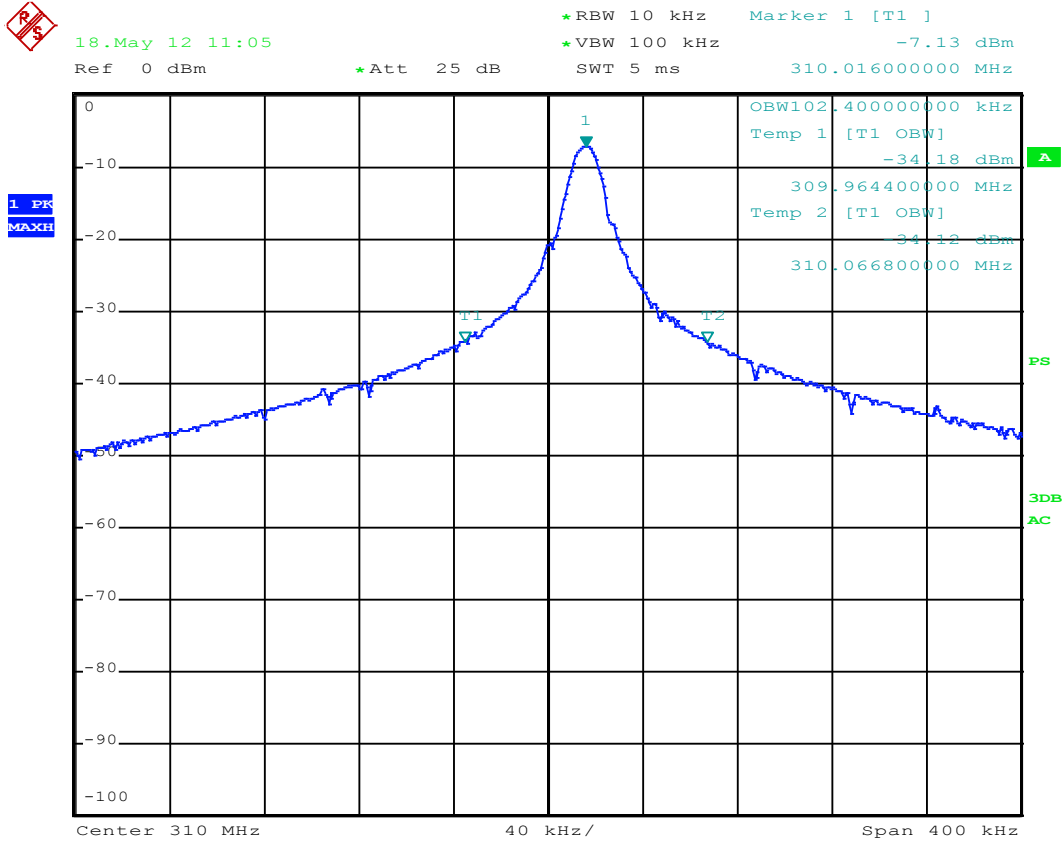


Figure 5 – 99% Bandwidth Graph for 315MHz

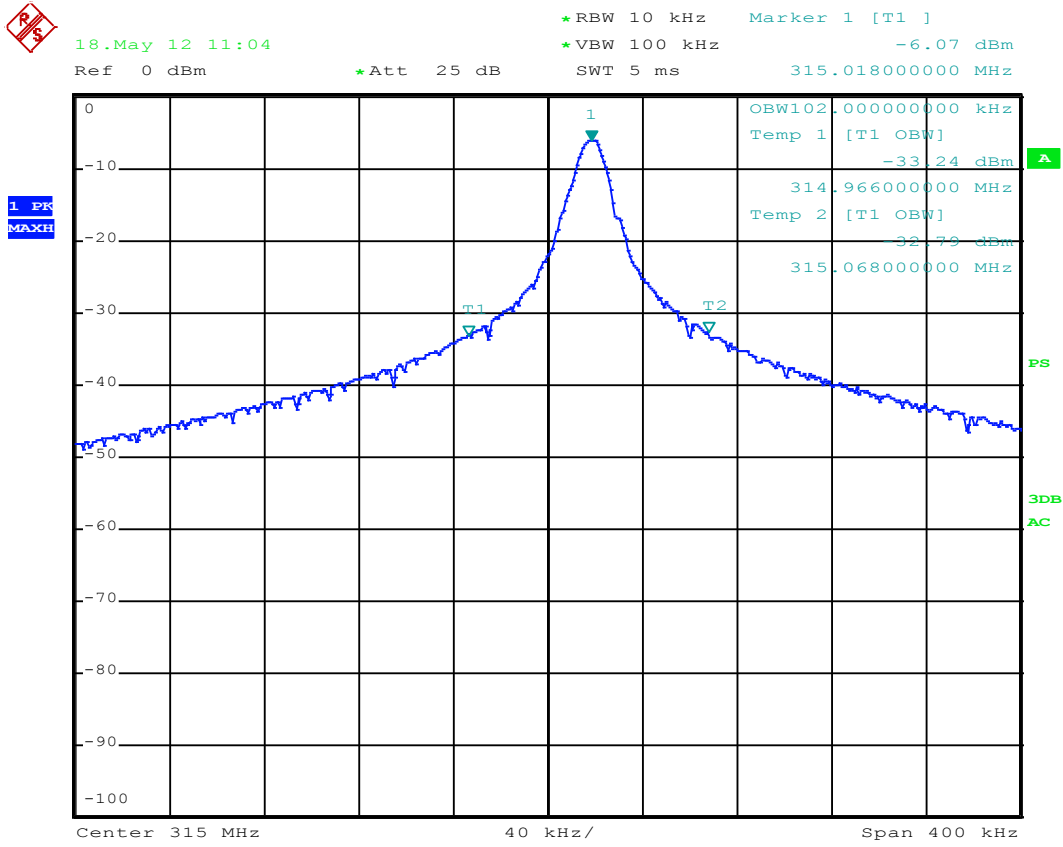
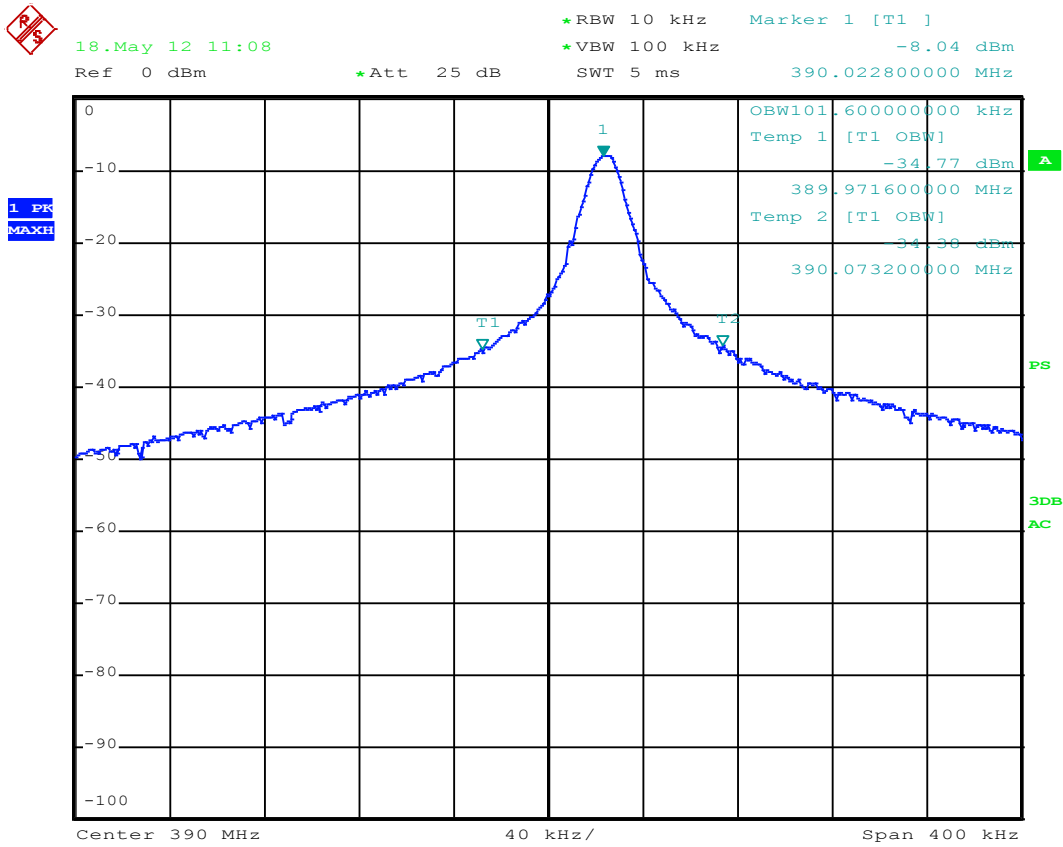


Figure 6 – 99% Bandwidth Graph for 390MHz



4.2 Test Conditions and Results – Cease Operation

Test Description	Measurements were made in the laboratory environment. A Dipole (or equivalent) antenna tuned to the transmit frequency was attached to the input of a spectrum analyzer. The device was operated and the transmission time measured with the spectrum analyzer set to zero span at the fundamental frequency.	
Basic Standard	47 CFR Part 15.231(a)	
Cease Operation Limits		
The transmissions shall stop within 5 seconds of either a button being released or if automatically controlled transmissions shall be stopped 5 seconds after transmissions begin.		

Table 5 Cease Operation Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

Table 6 Cease Operation Test Equipment

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323	Dec 28 2011	Dec 31 2012
Generic Near Filed Loop Antenna	-	-	-	-	-

Figure 7 Cease Operation Graph for 310MHz

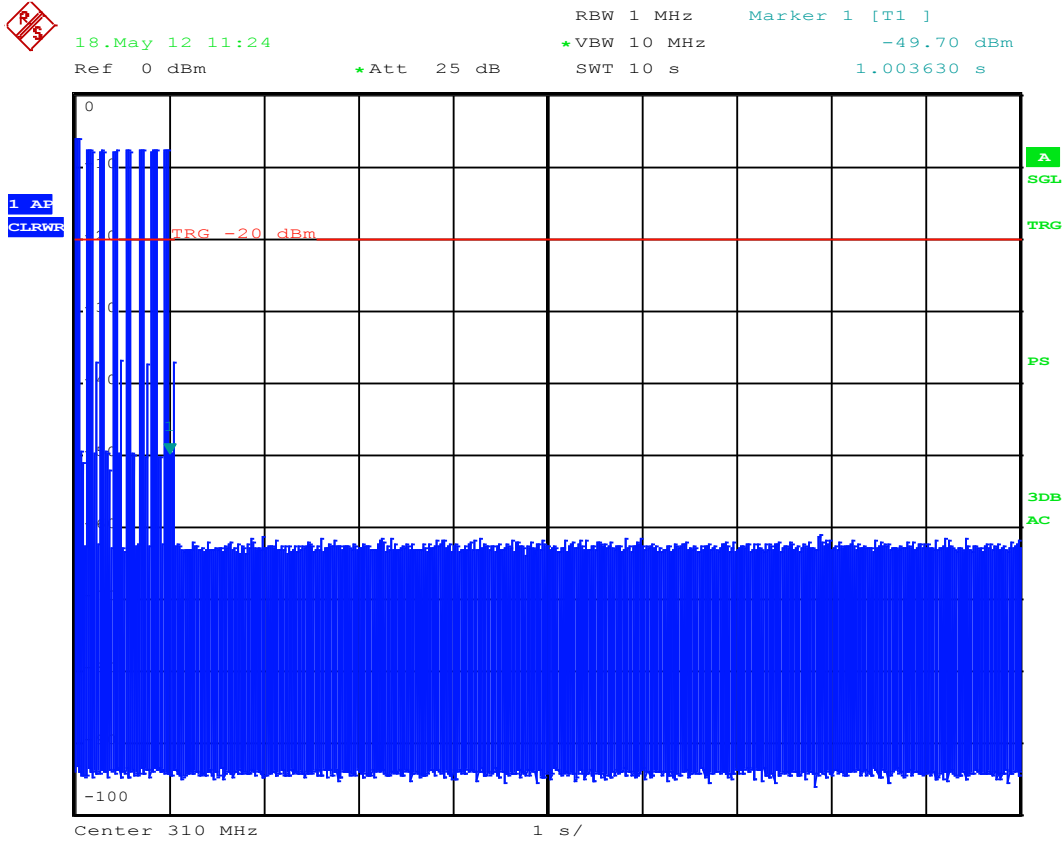


Figure 8 Cease Operation Graph for 315MHz

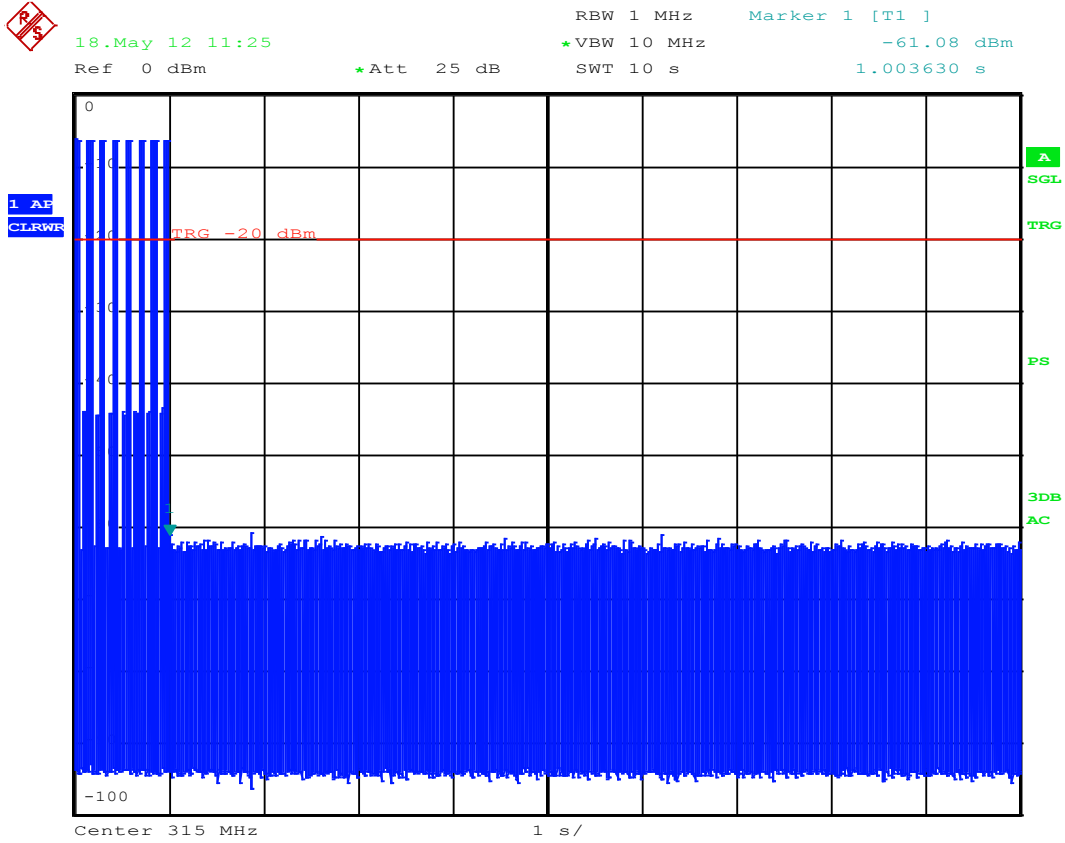
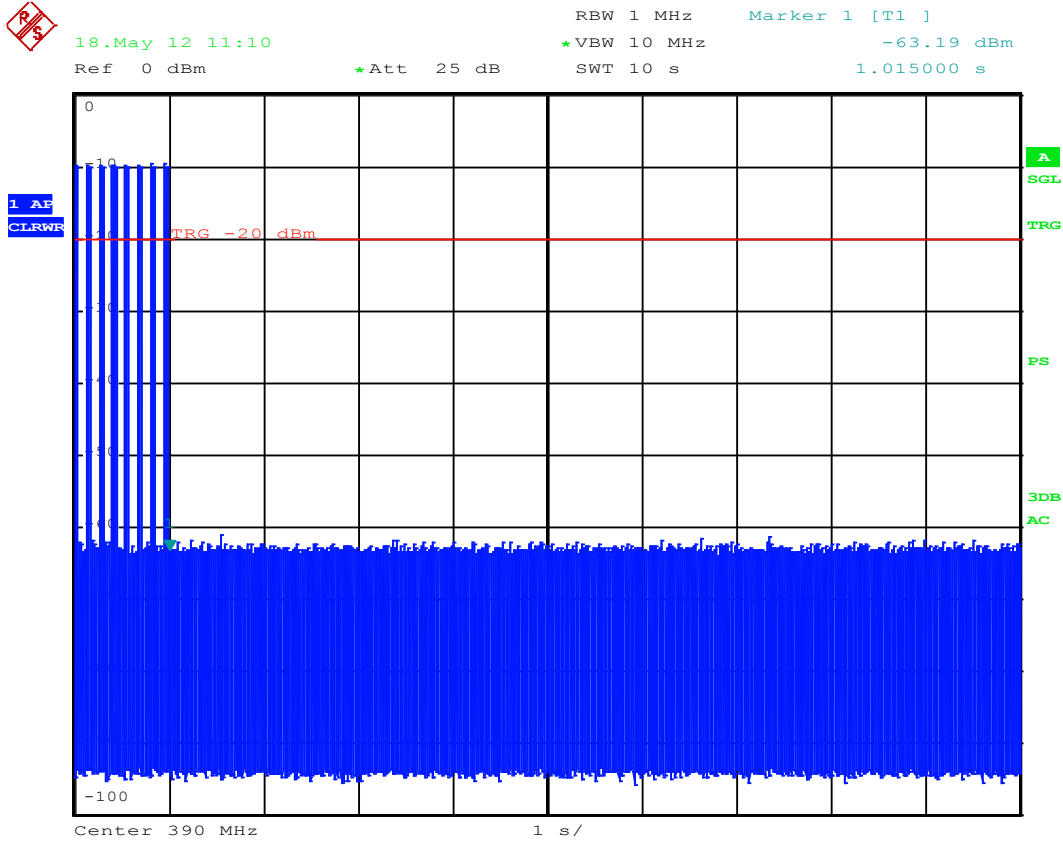


Figure 9 Cease Operation Graph for 390MHz



4.3 Test Conditions and Results – Pulse Train

Test Description	Measurements were made in the laboratory environment. A Dipole (or equivalent) antenna tuned to the transmit frequency was attached to the input of a spectrum analyzer. The pulse train was measured with the spectrum analyzer set to zero span at the fundamental frequency.
Basic Standard	FCC Part 15 Subpart A, 15.35
Pulse Train Limits	
There are no limits for this test. This data is used to calculate the averaging correction factor that is applied to the measured peak radiated emissions results.	

Table 7 Pulse Train Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

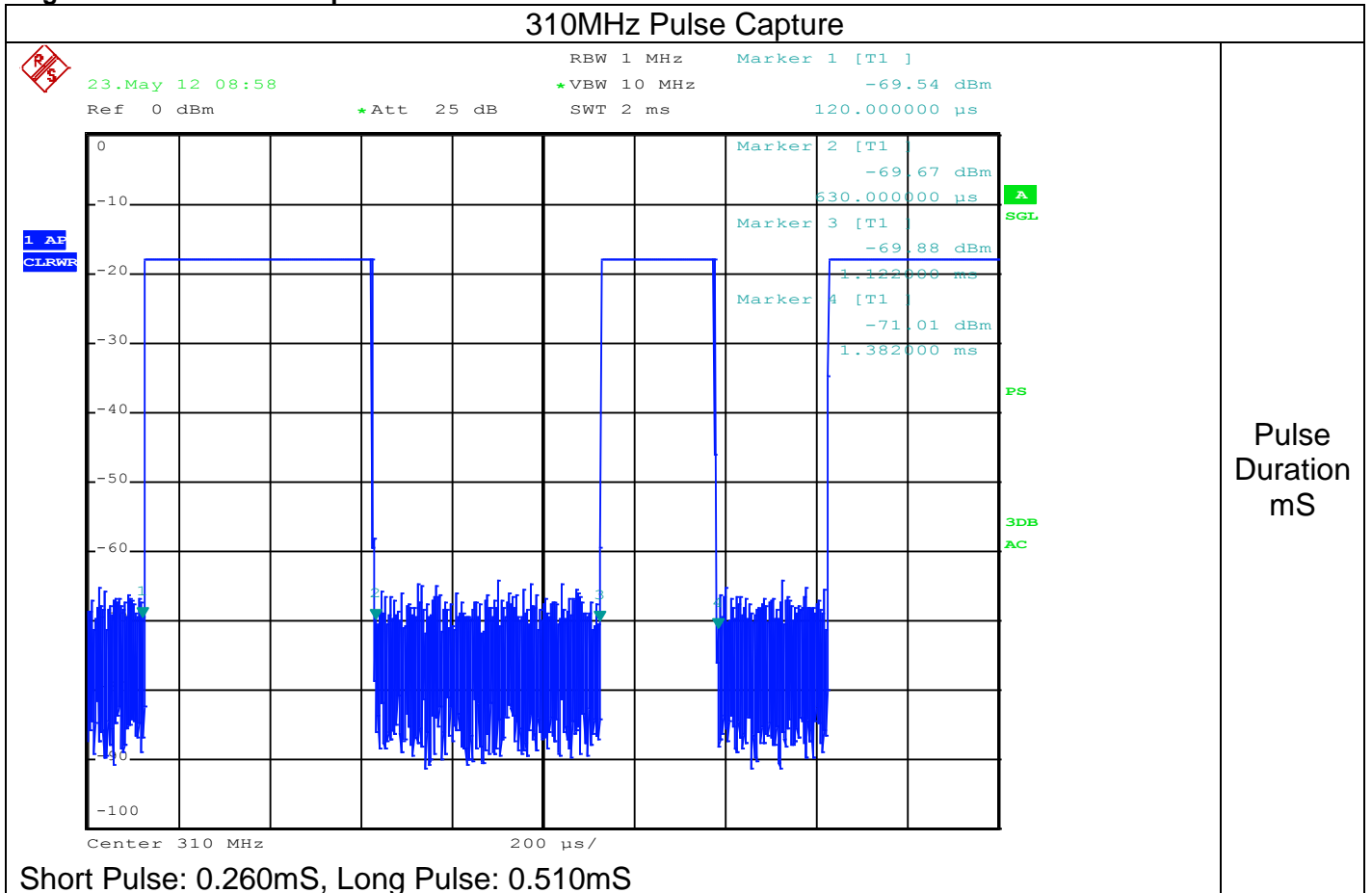
Table 8 Pulse Train Calculation

TX Frequency	Total TX time	Total Transmission time or 100ms whichever is lesser	DC Correction Factor (dB)
			$20 \log \left(\frac{PulseWidth}{Period} \right)$
310MHz	$(52 \times 0.260) + (17 \times 0.510)$	100ms	-13.08
315MHz	$(49 \times 0.260) + (17 \times 0.510)$	100ms	-13.39
390MHz	$(52 \times 0.260) + (17 \times 0.510)$	100ms	-13.08
Worst Case Duty Cycle: -13.08			

Table 9 Pulse Train Test Equipment

Test Equipment Used					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323	Dec 28 2011	Dec 31 2012
Generic Loop Near Field Antenna	-	-	-	-	-

Figure 10 Pulse Train Graphs for 310MHz



310MHz Pulse Capture



18.May 12 11:22

RBW 1 MHz

Marker 1 [T1]

*VBW 10 MHz

-65.78 dBm

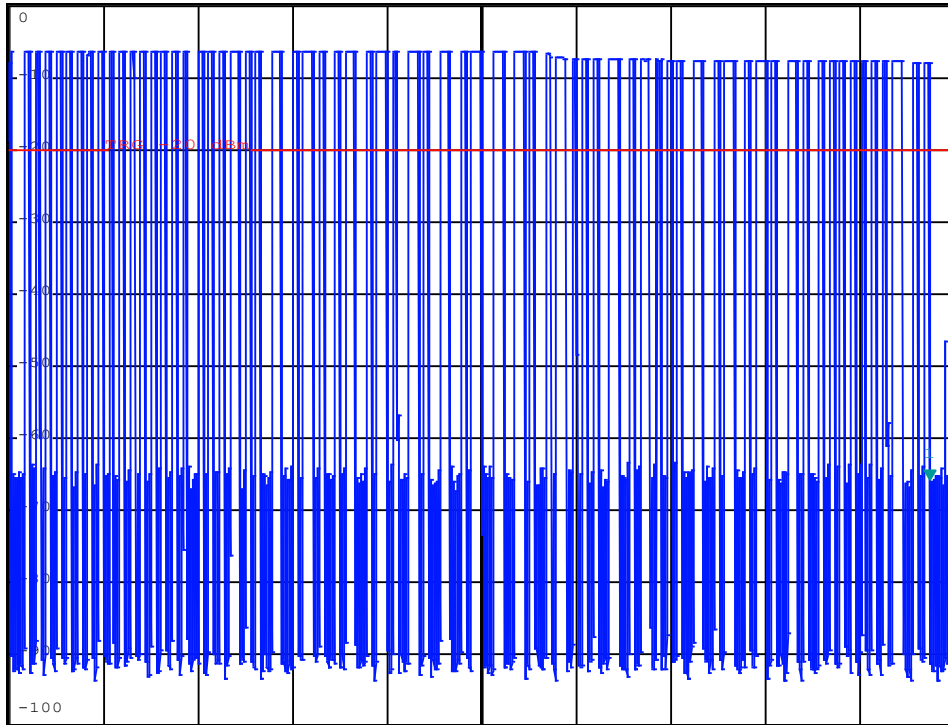
Ref 0 dBm

*Att 25 dB

SWT 45 ms

43.830000 ms

1 AF
CLRWR



Center 310 MHz

4.5 ms/

Number
of
Pulses

of Short Pulses: 52, # of Long Pulses: 17

310MHz Pulse Capture



18.May 12 11:21
Ref 0 dBm

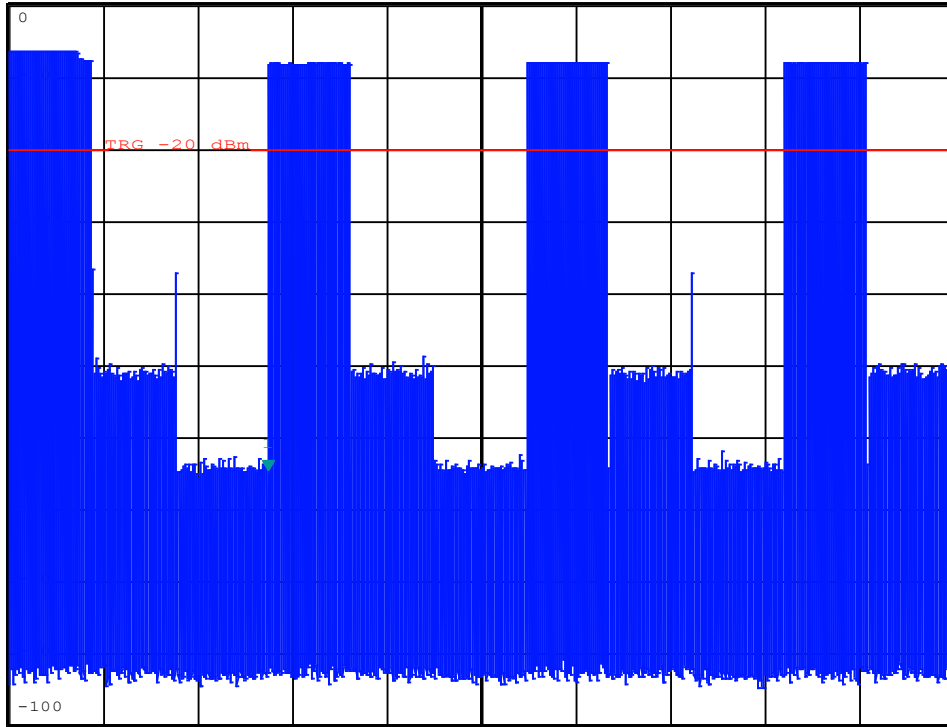
*Att 25 dB

RBW 1 MHz
*VBW 10 MHz
SWT 500 ms

Marker 1 [T1]

-64.41 dBm
136.500000 ms

1 AF
CLRWR

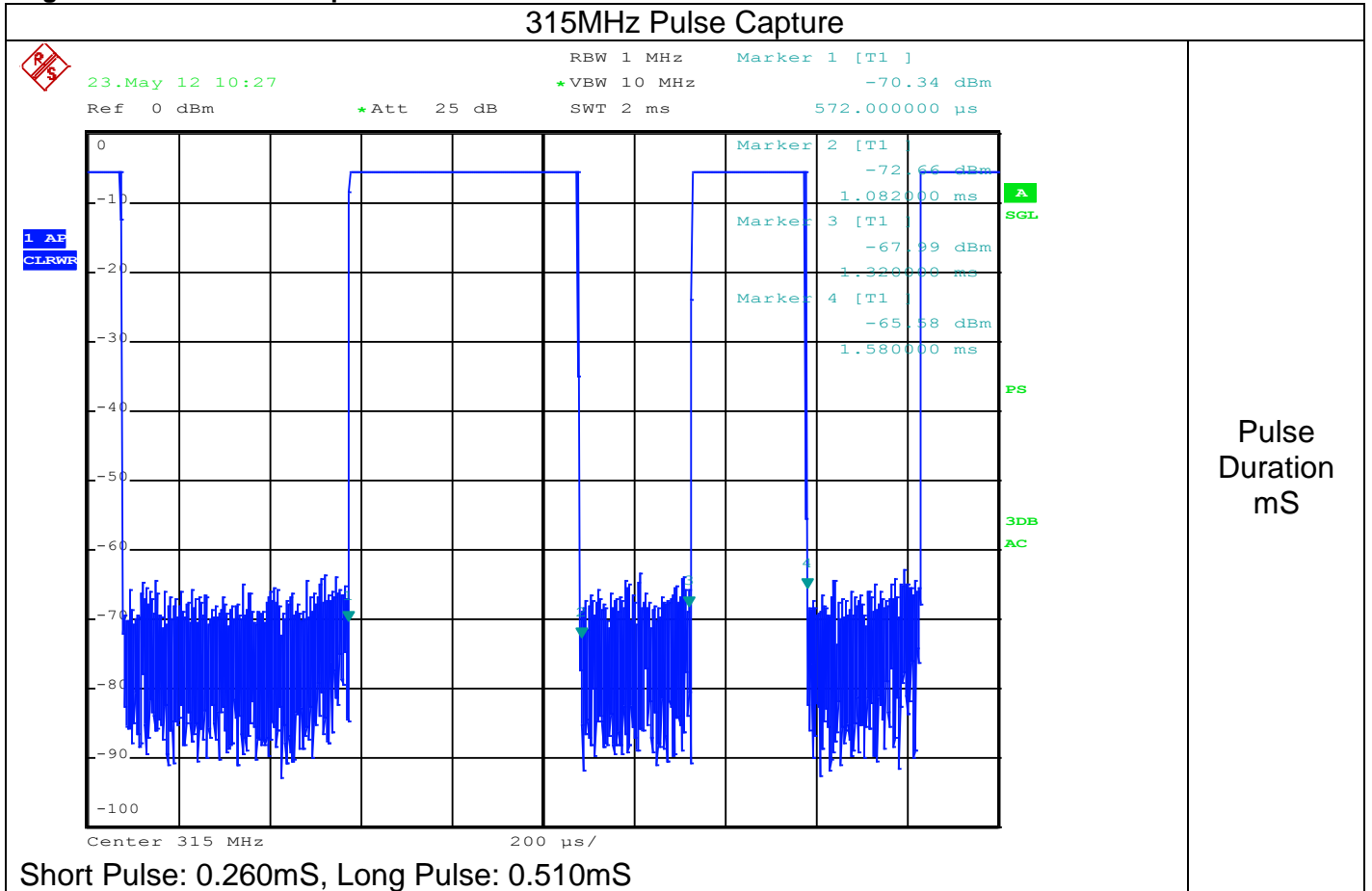


Center 310 MHz 50 ms/

Period

Period:136.5mS, use 100mS for DC calculation

Figure 11 Pulse Train Graphs for 315MHz



315MHz Pulse Capture



18.May 12 11:26

RBW 1 MHz

Marker 1 [T1]

*VBW 10 MHz

-67.04 dBm

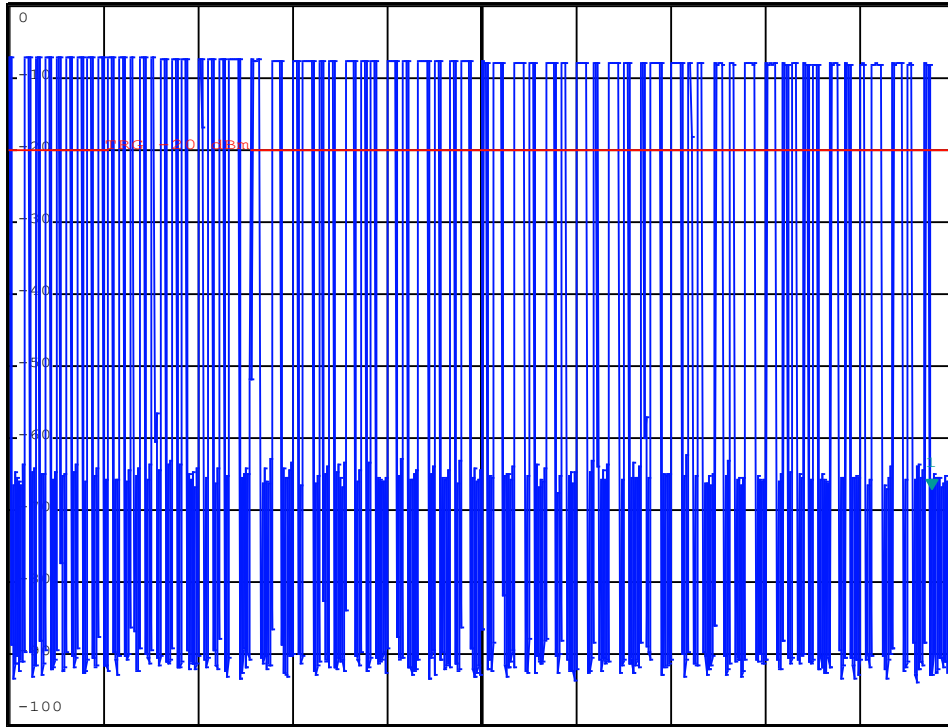
Ref 0 dBm

*Att 25 dB

SWT 45 ms

43.870000 ms

1 AF
CLRWR



Center 315 MHz

4.5 ms/

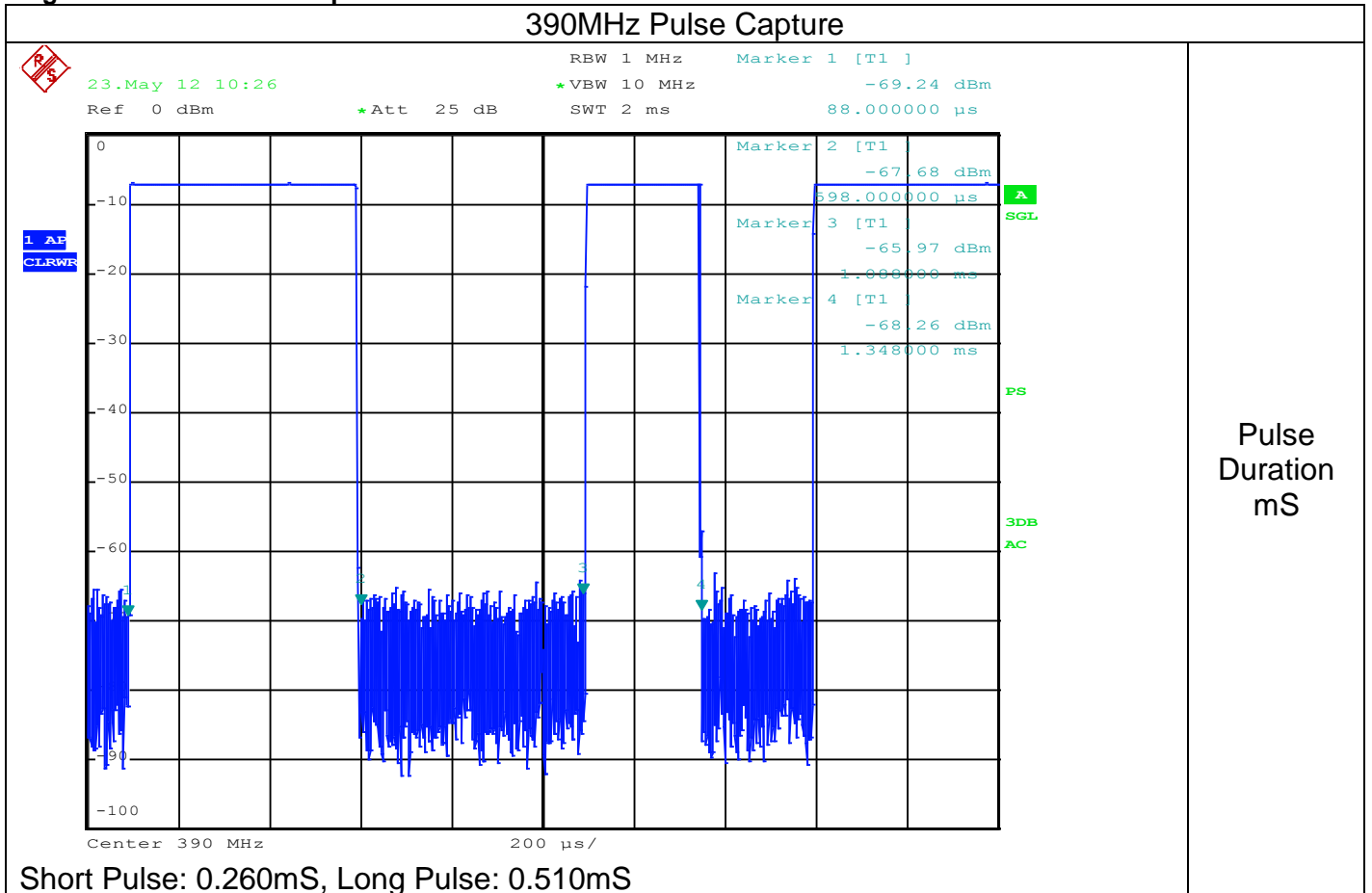
Number of Pulses

of Short Pulses: 49 , # of Long Pulses: 17

Period is the same as for 310MHz, (use 100mS for DC calculation)

Period

Figure 12 Pulse Train Graphs for 390MHz



390MHz Pulse Capture



18.May 12 11:11

RBW 1 MHz

Marker 1 [T1]

*VBW 10 MHz

-65.88 dBm

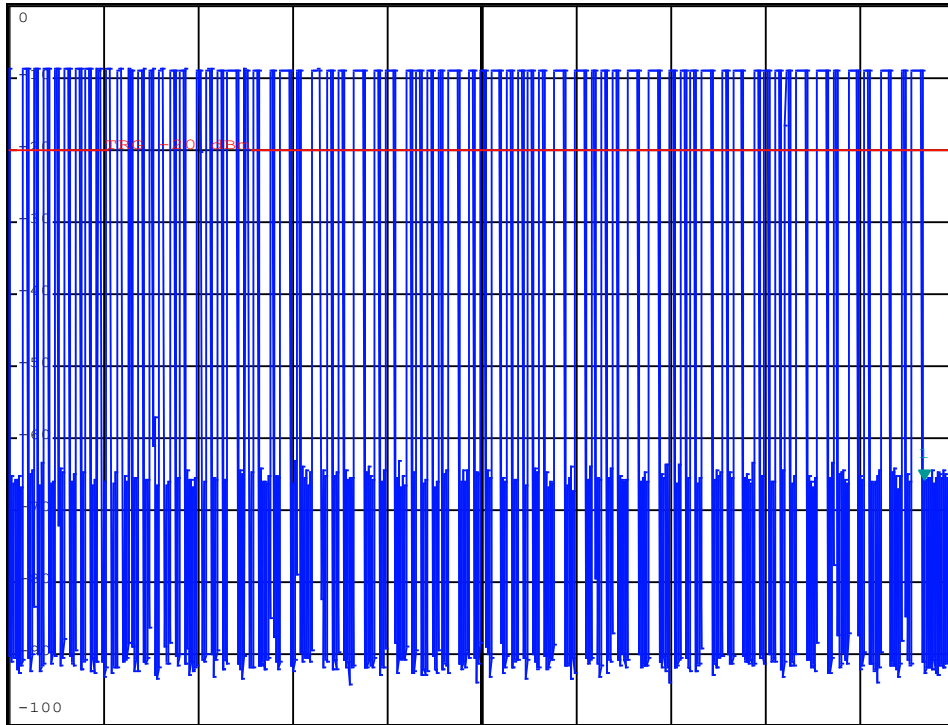
Ref 0 dBm

*Att 25 dB

SWT 45 ms

43.530000 ms

1 AF
CLRWR



Center 390 MHz

4.5 ms/

Number of Pulses

of Short Pulses: 52, # of Long Pulses: 17

Period is the same as for 310MHz, (use 100mS for DC calculation)

Period

4.4 Test Conditions and Results – RADIATED EMISSIONS Fundamental and Spurious

Test Description	Measurements were made in a 10-meter semi-anechoic chamber that complies to CISPR 16/ANSI C63.4:2003. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3-meter as noted. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in both horizontal and vertical polarities. Final measurements (quasi-peak or average as noted) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4-meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.	
Basic Standard	47 CFR Part 15 subpart C, and RSS-210	
UL LPG	80-EM-S0029	
	Frequency range	Measurement Point
Fully configured sample scanned over the following frequency range	30MHz – 1GHz	3 meter distance
	1GHz – 4GHz	3 meter distance
Restricted Band Limits		
Frequency (MHz)	Limit (dBµV/m)	
	Quasi-Peak	Peak
30 - 88	40.00	NA
88 - 216	43.52	NA
216 - 960	46.02	NA
960 - 1000	54	NA
Above 1000 (FCC)	NA	*54 (at 3-meter)
Fundamental Frequency Limits and Non-restricted band Harmonic Limits		
Frequency (MHz)	Limit (dBµV/m) @ 3m distance	
	Average - Fundamental	Peak - Fundamental
310	75.32	95.32
315	75.62	95.62
390	79.24	99.24
Supplementary information: *See section 4.3 for duty cycle information.		

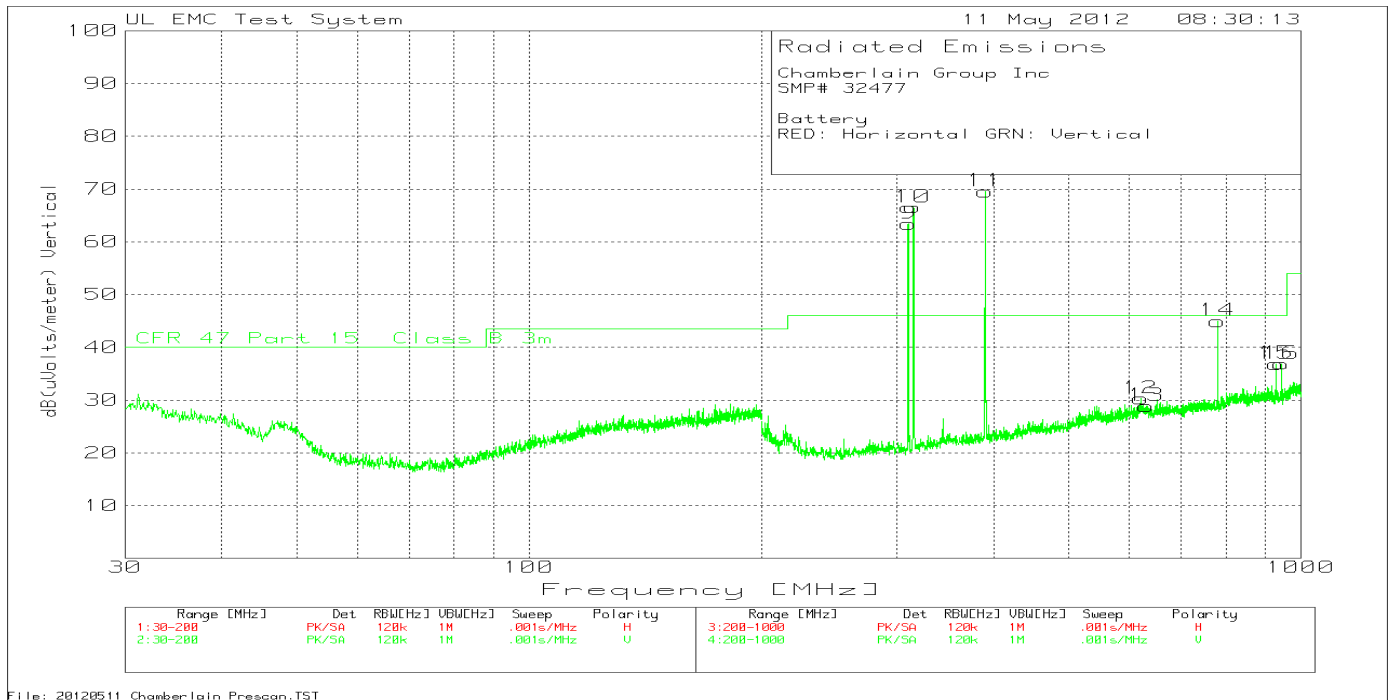
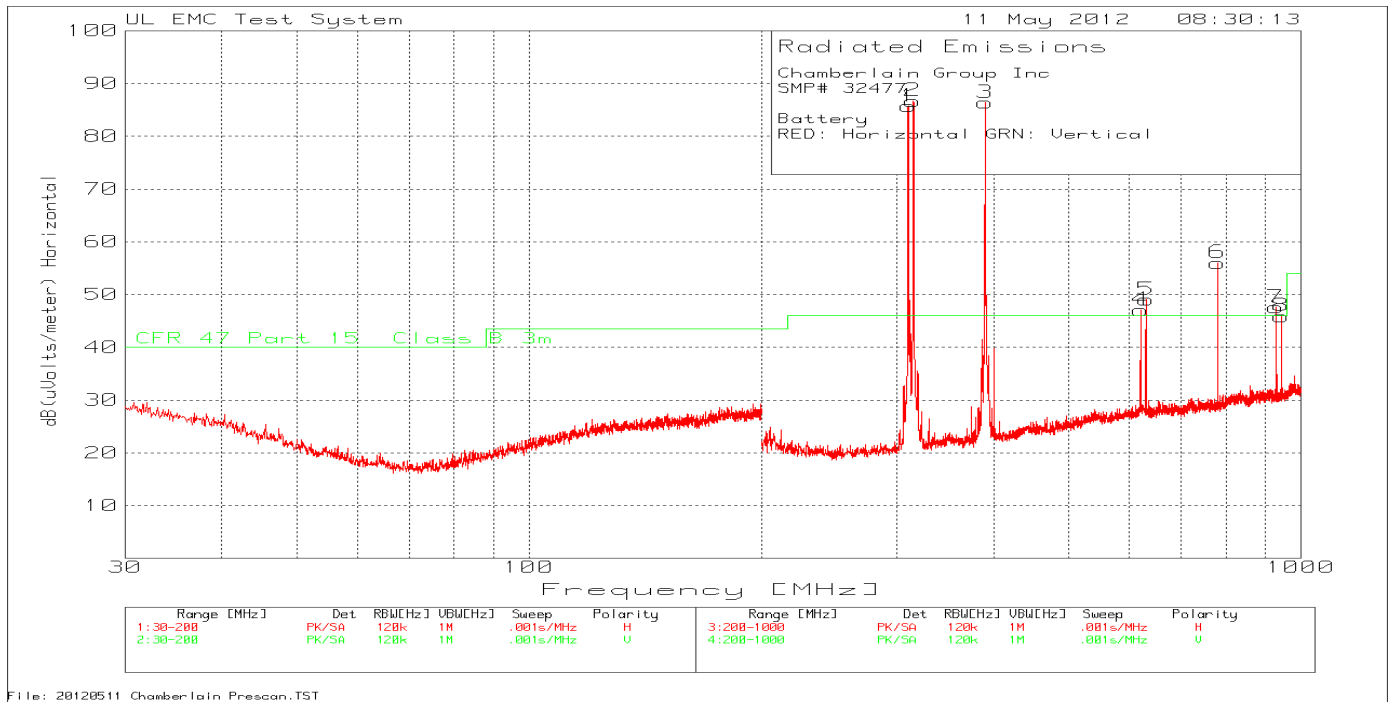
Table 10 Radiated Emissions EUT Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

Table 11 Radiated Emissions Test Equipment

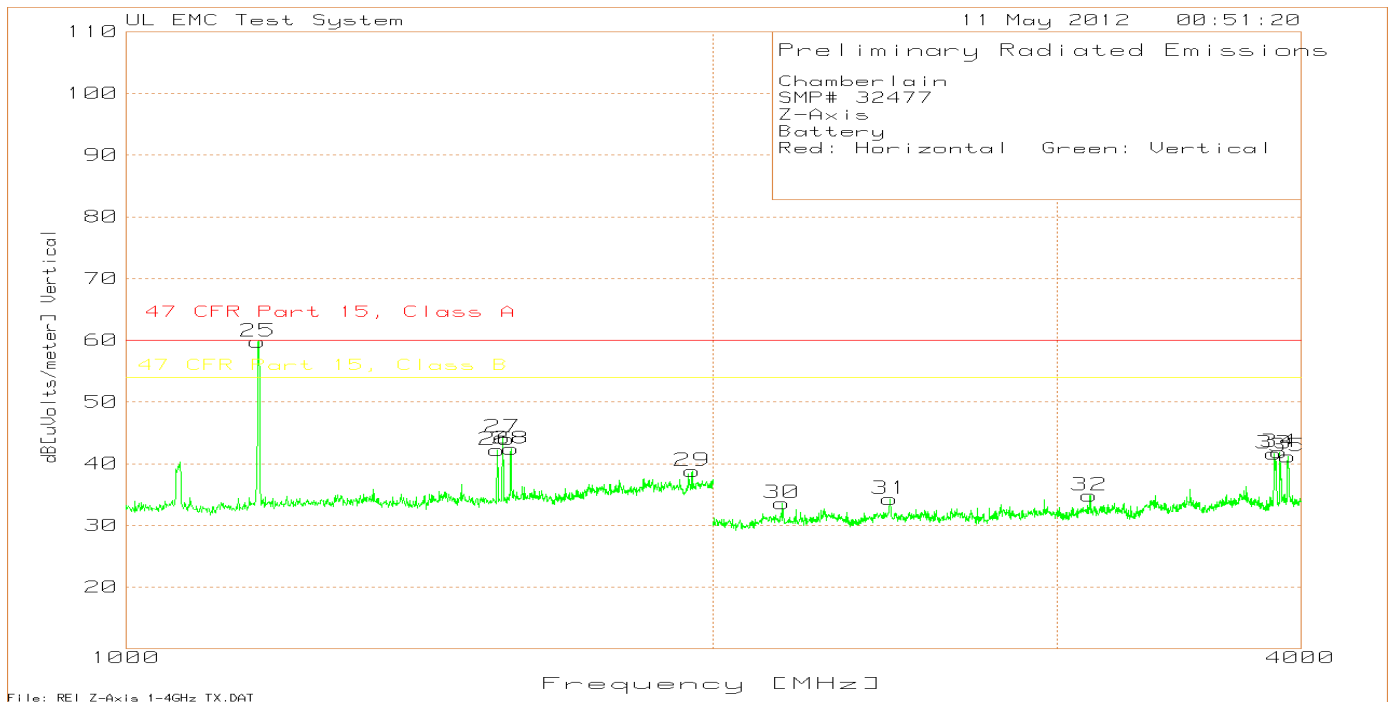
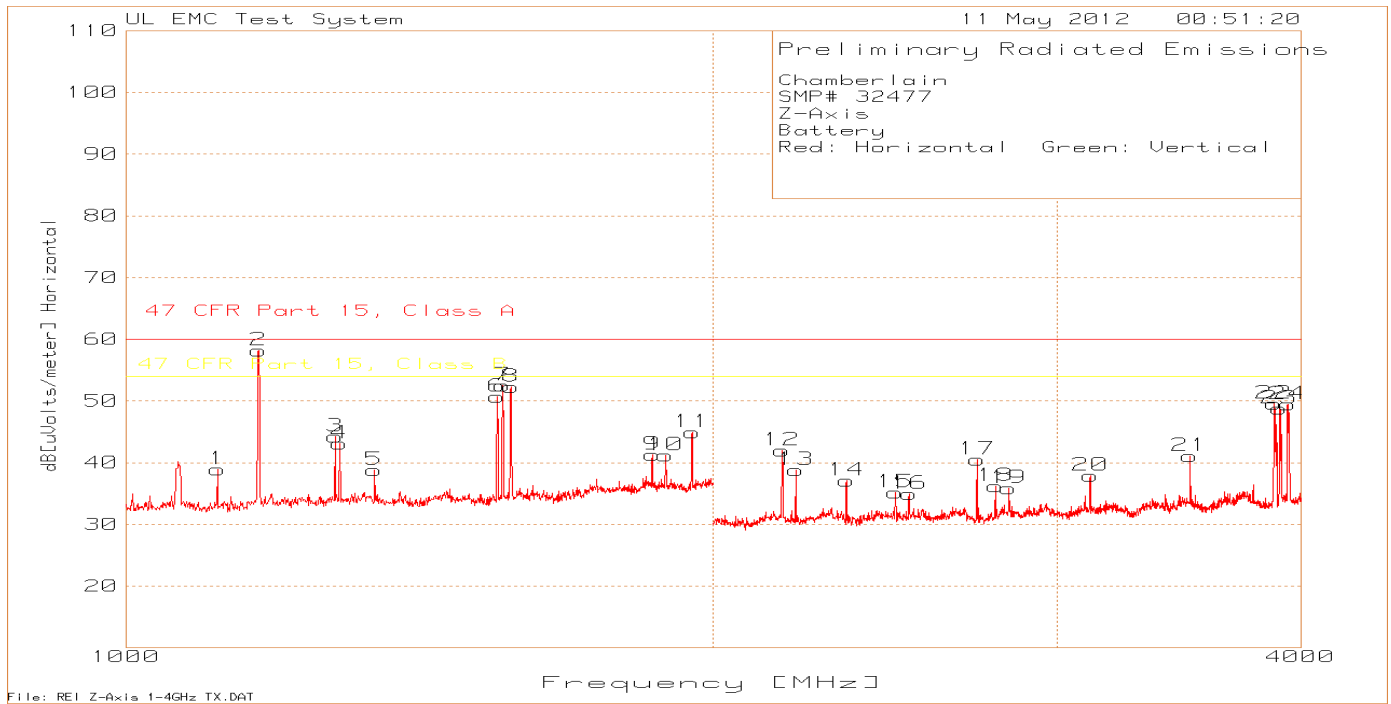
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESU	EMC4323	20111228	20121231
Bicon Antenna	Chase	VBA6106A	EMC4078	20120117	20130131
Log-P Antenna	Chase	UPA6109	EMC4313	20110929	20120629
Spectrum Analyzer	Rhode & Schwarz	FSEK	EMC4182	20111227	20121231
Antenna Array	UL	BOMS	EMC4276	20111227	20121231

Figure 13 Radiated Emissions Graph (Below 1GHz) for 310MHz, 315MHz, and 390MHz



* Plots are included for visual reference only.

Figure 14 Radiated Emissions Graph (Above 1GHz) for 310MHz, 315MHz, and 390MHz



* Plots are included for visual reference only.

Table 12- Maximized Worst Case Radiated Emissions Data Points

Test Frequency MHz	Meter Reading dBuV	Detector	Antenna Factor dB	Path Loss/Gain dB	Attenuator dB	Level dBuV/m	Duty Cycle Factor dB	Level with Duty Cycle dBuV/m	Limit dBuV/m	Margin	Azimuth [Degs]	Height [cm]	Polarity
310.019231	59.25	QP	13.7	2.1	10	85.05	-13.08	71.97	75.32	-3.35	43	103	Horz
310.0192	59.66	PK	13.7	2.1	10	85.46	-13.08	72.38	75.32	-2.94	43	103	Horz
310.019231	39.51	QP	13.7	2.1	10	65.31	-13.08	52.23	75.32	-23.09	335	130	Vert
310.0168	40.34	PK	13.7	2.1	10	66.14	-13.08	53.06	75.32	-22.26	335	130	Vert
315.016026	60.44	QP	14	2.1	10	86.54	-13.08	73.46	75.62	-2.16	277	105	Horz
315.0184	60.8	PK	14	2.1	10	86.9	-13.08	73.82	75.62	-1.8	277	105	Horz
315.016026	41.36	QP	14	2.1	10	67.46	-13.08	54.38	75.62	-21.24	146	130	Vert
315.016	41.86	PK	14	2.1	10	67.96	-13.08	54.88	75.62	-20.74	146	130	Vert
390.024039	56.52	QP	16	2.3	10	84.82	-13.08	71.74	79.24	-7.5	20	104	Horz
390.024	56.92	PK	16	2.3	10	85.22	-13.08	72.14	79.24	-7.1	20	104	Horz
390.025641	38.07	QP	16	2.3	10	66.37	-13.08	53.29	79.24	-25.95	122	117	Vert
390.0256	38.74	PK	16	2.3	10	67.04	-13.08	53.96	79.24	-25.28	122	117	Vert
620.064103	0.12	QP	20.2	3	10.1	33.42	-13.08	20.34	55.32	-34.98	105	344	Horz
619.8001	9.85	PK	20.2	3	10.1	43.15	-13.08	30.07	55.32	-25.25	105	344	Horz
620.038462	0.66	QP	20.2	3	10.1	33.96	-13.08	20.88	55.32	-34.44	24	176	Vert
620.793	9.58	PK	20.2	3	10.1	42.88	-13.08	29.8	55.32	-25.52	24	176	Vert
630.03	4.92	QP	20.4	3	10.1	38.42	-13.08	25.34	55.62	-30.28	357	160	Horz
630.042	13.06	PK	20.4	3	10.1	46.56	-13.08	33.48	55.62	-22.14	357	160	Horz
630.113782	4.86	QP	20.4	3	10.1	38.36	-13.08	25.28	55.62	-30.34	165	309	Vert
630.1138	12.09	PK	20.4	3	10.1	45.59	-13.08	32.51	55.62	-23.11	165	309	Vert
780.054487	22.11	QP	21.9	3.4	10.1	57.51	-13.08	44.43	59.24	-14.81	350	103	Horz
780.0521	23.6	PK	21.9	3.4	10.1	59	-13.08	45.92	59.24	-13.32	350	103	Horz
780.0537	13.93	QP	21.9	3.4	10.1	49.33	-13.08	36.25	59.24	-22.99	245	175	Vert
780.0465	16.73	PK	21.9	3.4	10.1	52.13	-13.08	39.05	59.24	-20.19	245	175	Vert
930.0609	9.36	QP	23.4	3.8	10.1	46.66	-13.08	33.58	55.32	-21.74	206	157	Horz
930.0441	13.56	PK	23.4	3.8	10.1	50.86	-13.08	37.78	55.32	-17.54	206	157	Horz
930.0609	2.68	QP	23.4	3.8	10.1	39.98	-13.08	26.9	55.32	-28.42	152	159	Vert
930.0589	9.31	PK	23.4	3.8	10.1	46.61	-13.08	33.53	55.32	-21.79	152	159	Vert
945.051282	8.56	QP	23.5	3.8	10.1	45.96	-13.08	32.88	55.62	-22.74	255	154	Horz
945.0633	13.19	PK	23.5	3.8	10.1	50.59	-13.08	37.51	55.62	-18.11	255	154	Horz
945.052885	2.49	QP	23.5	3.8	10.1	39.89	-13.08	26.81	55.62	-28.81	168	150	Vert
945.0793	9.31	PK	23.5	3.8	10.1	46.71	-13.08	33.63	55.62	-21.99	168	150	Vert
1170.1232	93.49	PK	24.8	-57.24	0	61.05	-13.08	47.97	54	-6.03	0	133	Horz
1550.1022	82.1	PK	25.2	-56.02	0	51.28	-13.08	38.2	54	-15.8	245	102	Horz
1560.009	83.95	PK	25.2	-55.67	0	53.48	-13.08	40.4	54	-13.6	260	101	Horz
1575.0631	82.35	PK	25.3	-55.29	0	52.36	-13.08	39.28	54	-14.72	58	101	Horz
1170.0451	92.47	PK	24.8	-57.24	0	60.03	-13.08	46.95	54	-7.05	143	100	Vert
3875.2774	78.83	PK	23.9	-52.03	0	50.7	-13.08	37.62	54	-16.38	224	100	Horz
3900.2064	78.81	PK	23.8	-52.18	0	50.43	-13.08	37.35	54	-16.65	219	100	Horz
3937.5731	78.84	PK	24	-52.04	0	50.8	-13.08	37.72	54	-16.28	222	100	Horz

Model Number: PP3V

Client Name: Chamberlain Group Inc.

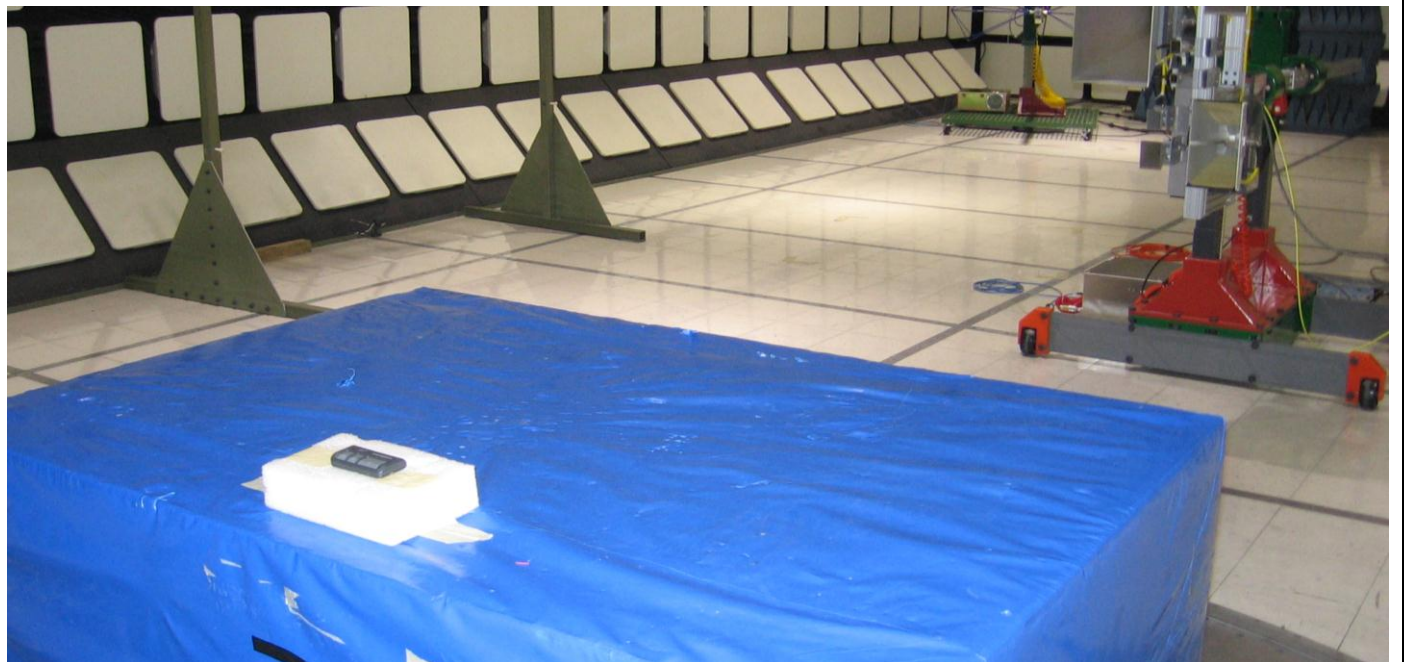
Table 13- Above 1GHz Marker peak data (all points with less than 6dB margin were maximized above).

Test Frequency MHz	Meter Reading dBuV	Detector	Antenna Factor dB	Path Loss/Gain dB	Attenuator dB	Level dBuV/m	Duty Cycle Factor dB	Level with Duty Cycle dBuV/m	Limit dBuV/m	Margin	Height [cm]	Polarity
1114.114	71.91	PK	24.5	-57.53	0	38.88	-13.08	25.8	54	-28.2	100	Horz
1170.17	90.66	PK	24.8	-57.23	0	58.23	-13.08	45.15	54	-8.85	150	Horz
1280.28	75.8	PK	25.2	-56.72	0	44.28	-13.08	31.2	54	-22.8	100	Horz
1287.287	74.52	PK	25.2	-56.6	0	43.12	-13.08	30.04	54	-23.96	100	Horz
1341.341	70.08	PK	25.2	-56.49	0	38.79	-13.08	25.71	54	-28.29	100	Horz
1550.551	81.5	PK	25.2	-56.02	0	50.68	-13.08	37.6	54	-16.4	100	Horz
1560.561	82.95	PK	25.2	-55.64	0	52.51	-13.08	39.43	54	-14.57	100	Horz
1575.576	82.26	PK	25.3	-55.28	0	52.28	-13.08	39.2	54	-14.8	100	Horz
1860.861	68.54	PK	27.2	-54.44	0	41.3	-13.08	28.22	54	-25.78	150	Horz
1890.891	68.11	PK	27.4	-54.33	0	41.18	-13.08	28.1	54	-25.9	150	Horz
1950.951	71.88	PK	27.4	-54.39	0	44.89	-13.08	31.81	54	-22.19	150	Horz
2169.446	72.84	PK	21.7	-52.53	0	42.01	-13.08	28.93	54	-25.07	99	Horz
2204.136	70.28	PK	21.8	-53.23	0	38.85	-13.08	25.77	54	-28.23	99	Horz
2340.227	68.26	PK	21.7	-52.86	0	37.1	-13.08	24.02	54	-29.98	99	Horz
2480.32	65.4	PK	22	-52.25	0	35.15	-13.08	22.07	54	-31.93	99	Horz
2520.347	65.18	PK	22.1	-52.34	0	34.94	-13.08	21.86	54	-32.14	99	Horz
2729.82	70.65	PK	22.1	-52.27	0	40.48	-13.08	27.4	54	-26.6	99	Horz
2789.86	65.69	PK	22.2	-51.64	0	36.25	-13.08	23.17	54	-30.83	99	Horz
2835.223	64.75	PK	22.3	-51.13	0	35.92	-13.08	22.84	54	-31.16	99	Horz
3120.747	66.47	PK	22.7	-51.24	0	37.93	-13.08	24.85	54	-29.15	99	Horz
3510.34	68.32	PK	23.5	-50.73	0	41.09	-13.08	28.01	54	-25.99	99	Horz
3875.917	77.68	PK	23.9	-52.03	0	49.55	-13.08	36.47	54	-17.53	99	Horz
3901.268	77.08	PK	23.8	-52.14	0	48.74	-13.08	35.66	54	-18.34	99	Horz
3938.626	77.5	PK	24	-52.03	0	49.47	-13.08	36.39	54	-17.61	99	Horz
1169.169	92.21	PK	24.8	-57.22	0	59.79	-13.08	46.71	54	-7.29	101	Vert
1550.551	73.02	PK	25.2	-56.02	0	42.2	-13.08	29.12	54	-24.88	101	Vert
1560.561	74.7	PK	25.2	-55.64	0	44.26	-13.08	31.18	54	-22.82	101	Vert
1575.576	72.37	PK	25.3	-55.28	0	42.39	-13.08	29.31	54	-24.69	101	Vert
1950.951	65.79	PK	27.4	-54.39	0	38.8	-13.08	25.72	54	-28.28	101	Vert
2169.446	64.48	PK	21.7	-52.53	0	33.65	-13.08	20.57	54	-33.43	150	Vert
2462.975	64.41	PK	22	-52.12	0	34.29	-13.08	21.21	54	-32.79	102	Vert
3119.413	63.38	PK	22.7	-51.2	0	34.88	-13.08	21.8	54	-32.2	150	Vert
3875.917	69.8	PK	23.9	-52.03	0	41.67	-13.08	28.59	54	-25.41	150	Vert
3901.268	70.19	PK	23.8	-52.14	0	41.85	-13.08	28.77	54	-25.23	150	Vert
3938.626	69.23	PK	24	-52.03	0	41.2	-13.08	28.12	54	-25.88	150	Vert

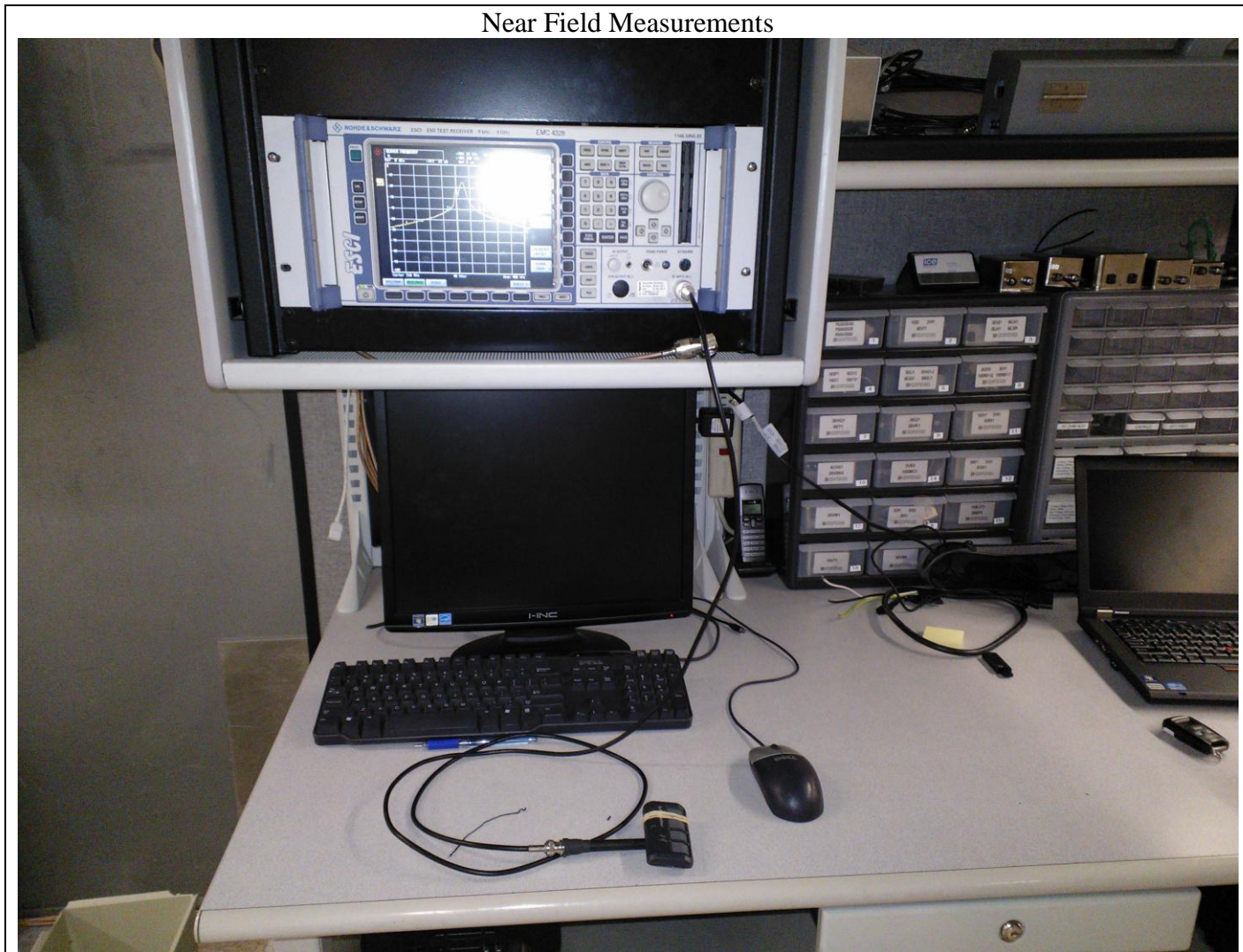
Appendix A

Test Setup Photos

Radiated Emissions (Z-Axis)



Near Field Measurements



Appendix B

Accreditations and Authorizations



NVLAP Lab code: 100414-0

NVLAP: The National Institute of Standards and Technology (NIST) administers the National Voluntary Laboratory Accreditation Program (NVLAP). NVLAP is comprised of laboratory accreditation programs (LAPs) which are established on the basis of requests and demonstrated need. Each LAP includes specific calibration and/or test standards and related methods and protocols assembled to satisfy the unique needs for accreditation in a field of testing or calibration. NVLAP accredits public and private laboratories based on evaluation of their technical qualifications and competence to carry out specific calibrations or tests. Accreditation criteria are established in accordance with the U.S. Code of Federal Regulations (CFR, Title 15, Part 285), NVLAP Procedures and General Requirements, and encompass the requirements of ISO/IEC 17025. For a full scope listing see <http://ts.nist.gov/standards/scopes/1004140.htm>



FCC: Details of the measurement facilities used for these tests have been filed with the Federal Communications Commission's Laboratory in Columbia, Maryland (Ref. No. 91044).



Industry Canada Industrie Canada

Industry of Canada: Accredited by Industry Canada for performance of radiated measurements. Our test site complies with RSP 100, Issue 7, Section 3.3. File #: IC 2180



VCCI: Accepted as an Associate Member to the VCCI. The measurement facilities detailed in this test report have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. Registration Nos.: Radiated Emissions R-621, Conducted Emissions C-642.



ICASA: ICASA (Independent Communications Authority of South Africa) has appointed UL as a Designated Test Laboratory to test Telecommunications equipment for type approval in compliance with CISPR 22 to assist in fulfilling its mandate under section 54(1) of the Telecommunications Act, 1996 (Act 103 of 1996).



NIST/CAB: Validated by the European Commission as a U.S. Conformity Assessment Body (CAB) of the U.S.-EU Mutual Recognition Agreement (MRA) for the Electromagnetic Compatibility - Council Directive 2004/108/EC, Annex III (2-3). Also validated for the Telecommunication Equipment-Council Directive 99/5/EC, Annex III and IV, Identification Number: 0983.

NIST/CAB: Provisioned to act as a U.S. Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the Asia Pacific Economic Cooperation (APEC) MRA between the American Institute in Taiwan (AIT) and the United States. Our laboratory is considered qualified to test equipment subject to the applicable EMC regulations of the Chinese Taipei Bureau of Standards, Metrology and Inspection (BSMI) which require testing to CNS 13438 (CISPR 22).

NIST/CAB: Recognized by the Infocomm Development Authority of Singapore (IDA) under the Asia Pacific Economic Cooperation Mutual Recognition Agreement (APEC MRA). Our laboratory is provisionally designated to act as a Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the APEC MRA. Our scope of designation includes IDA TS EMC (CISPR 22), IEC 61000-4-2, -4-3, -4-4, -4-5, and -4-6

